

IN THE CLAIMS:

1. (Amended) An electronically commutated motor comprising
a stator, a rotor (39), and a program-controlled
[microprocessor or microcontroller (11), hereinafter called a]
microprocessor, serving to control commutation of the motor;
an apparatus for sensing a time variable (t_H) that is substantially
inversely proportional to the rotation speed of the rotor (39);
an apparatus for calculating a time interval (t_{TI}) dependent on that
time variable (t_H);
an apparatus for triggering a motor control interrupt routine [(FIG.
10)] at [a time] an instant offset (t_{TI}) from a predefined rotor position,
that offset corresponding to the time interval (t_{TI}) dependent on the
sensed time variable (t_H);
wherein the motor control interrupt routine contains program steps
(S310, S318, S320, S322) for effecting a commutation of the motor.
2. (Amended) The motor according to claim 1, wherein
the motor control interrupt routine [(FIG. 10)] comprises program
steps (S304, S306) which prevent a commutation from being effected if the
time interval (t_{TI}) dependent on the sensed time variable is greater than
a time span (t_H) presently required by the rotor (39) to travel through a
predefined angular distance.
3. (Amended) The motor according to claim 2, [having] further comprising
an apparatus which triggers a rotor position-dependent interrupt
routine [(FIG. 8)] at predefined rotor positions.
4. (Amended) The motor according to claim 3, wherein
a timer (CNT_HL), controllable by the rotor position-dependent
interrupt routines [(FIG. 8)], is provided, in order to sense the time
variable that is substantially inversely proportional to the rotation speed
of the rotor.

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5. (Amended) The motor according to claim 4, wherein the timer (CNT_HL) is also configured to trigger a motor control interrupt routine [(FIG. 10)].

6. (Amended) The motor according to claim 5, wherein the timer (CNT_HL) is loadable, during a rotor position-dependent interrupt [(FIG. 8)], with a first predefined count value (t_B) which corresponds to the time offset (t_TI) dependent on the sensed time variable (t_H); and which brings about a motor control interrupt [(FIG. 10)] after counting that first predefined count value.

7. (Amended) The motor according to claim 3, [any of the foregoing claims,] wherein a rotor-position-dependent interrupt [(FIG. 8)] has a higher priority than a motor control interrupt [(FIG. 10)].

8. (Amended) The motor according to claim 4, [any of claims 4 through 7,] wherein the timer (CNT_HL) is loadable, during a motor control interrupt (FIG. 10: S302), with a predefined count value (t_AR); and, subsequent to that loading operation, a count is performed until the next rotor position-dependent interrupt [(FIG. 8)], so as to ascertain, by taking the difference between the predefined count value (t_AR) and the counter status (t_E) upon reaching the next rotor position-dependent interrupt [(FIG. 8)], a time offset [(FIG. 7A: t_1)] between these interrupt operations.

9. (Amended) The motor according to claim 8, [wherein] further comprising an autoreload register (AR) for loading the predefined count value (t_AR), which register stores the first predefined count value (t_TI) and feeds it to the timer (CNT_HL) during the motor control interrupt (FIG. 10) as the predefined count value. [, is provided for loading the predefined count value (t_AR).]

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proportional to the rotation speed of the motor to a predefined value (t SZW) corresponding to a minimum rotation speed (S264);

storing a logical value (SZW), corresponding to a result of said comparison result; and

if that logical value (SZW) has a predefined value, suppressing (S304, S306) the triggering of a commutation that would otherwise be accomplished after the first time (t TI) has elapsed.

35. The method according to claim 30, further comprising detecting when a predefined rotor position is reached, and executing a rotor position-dependent interrupt with an interrupt routine at the beginning of which a timer (CNT_HL), providing time measurement, is stopped (S202), and its instantaneous value is stored in a variable (t E).

36. The method according to claim 35, further comprising
in the rotor-position-dependent interrupt routine, stopping (S202)
the timer (CNT_HL) providing time measurement, then loading the timer with
a numerical value (t_TI) previously calculated in accordance with the
predefined calculation rule, and thereafter restarting the timer (S238).

37. The method according to claim 36, further comprising using the time span, between the stopping of the timer (CNT_HL) providing time measurement and the restarting thereof, as a correction factor (t_CORR) during said step of ascertaining the time variable (t_H) that is substantially inversely proportional to the rotation speed of the motor.

38. The method according to claim 30,
further comprising the steps of
ascertaining said time variable that is substantially inversely
proportional to the rotation speed of the rotor;
using said ascertained time variable in calculating (542, 544, 546)
said first time interval corresponding to the calculated numerical value
(t_{TI}), which is measured from a predefined first rotor position; and
measuring said first time interval, corresponding to said calculated
numerical value, beginning at a predetermined rotor position that is
reached about one rotor revolution after that ascertaining step.

39. The method according to claim 30, further comprising
determining whether sufficient processor time is available for
executing a predetermined non-time critical process step and, if so,

executing a subroutine which performs said predetermined non-time-critical process step.

40. The method according to claim 39, further comprising calculating said time variable (t_H) that is substantially inversely proportional to the rotation speed of the motor, and calculating the numerical value (t_{TI}) on which measurement of the first time interval is based, as part of said subroutine executed when processor time is available.

41. The method according to claim 30, further comprising loading, from a nonvolatile memory (26) associated with the motor, at least one parameter (t_{ZW}), necessary for calculations, into a random-access memory (RAM 25) of the microprocessor (11).

42. The method according to claim 41, further comprising modifying, via a bus connection (30), at least one value stored in said nonvolatile memory (26).

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43. An electronically commutated motor comprising
a stator,
a rotor (39),
a microprocessor which executes a program which controls commutation
of the motor (M),
means for starting a timer (CNT_HL) with a predefined start value
(t_TI) at at least one predefined rotational position of said rotor (39);
means, responsive to said timer (CNT_HL), for triggering an interrupt
in said program of said microprocessor after elapse of a time interval
having a duration dependent on the start value (t_TI); and
means for commutating (S318, S320, S322) said motor during said
interrupt.
44. The motor according to claim 43, further comprising
means for deriving the start value (t_TI) of the timer (CNT_HL) as a
function of a rotation-speed-dependent time interval (t_H) which the rotor
(39) has required, in a time period preceding that commutation,
to rotate through a predefined rotation angle.
45. The motor according to claim 44, wherein said means for deriving
further comprises
means for subtracting a predefined time (t_ZW)
from the rotation-speed-dependent time interval (t_H)
as part of a calculation of the start value (t_TI).

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46. A method of determining a rotation speed-dependent variable in an electronically commutated motor (M) which includes
- a stator,
 - a permanent-magnet rotor (39),
 - a galvanomagnetic sensor (40) controlled by that rotor,
- a microprocessor (11), a control program associated with that microprocessor, and a timer (CNT_HL), comprising the steps of:
- a) converting an output signal of the galvanomagnetic sensor (40) into a substantially square-wave signal (HALL);
 - b) sensing, in the microprocessor, predefined signal changes of the square-wave signal (HALL) and converting each signal change into a respective rotor-position-dependent interrupt (FIG. 4: Y);
 - c) at a rotor-position-dependent interrupt (Y), recording a first counter status (t_0) of the timer;
 - d) at a rotor position-dependent interrupt (Y) subsequent thereto, recording a second counter status (t_E) of the timer;
 - e) calculating a difference between the two counter statuses (t_0 , t_E) and deriving, from said difference, a value (HL) which corresponds to time required by the rotor (39) to travel through a predefined rotation angle; and using said value (HL) as the rotation-speed-dependent variable.
47. An electronically commutated motor (M) comprising
- a stator (38) and a rotor (39),
 - a program-controlled microprocessor(11), adapted for controlling the commutation of the motor (M); and
 - a rotor position sensor (40, 41) whose output signal is applied, for purposes of analysis by the microprocessor (11), to an interrupt-capable input of that microprocessor, for processing therein;
- said microprocessor furnishing, at at least one output of the microprocessor, a control signal (OUT1, OUT2), for commutation of the motor, that is shifted, with respect to the signal of the rotor position sensor (40, 41), by a shift time, the duration of the shift time being a function of the rotation speed of said motor.

48. The electronically commutated motor (M) according to claim 47, wherein the microcontroller (11) comprises at least one interrupt-capable timer (CNT_HL) with which the at least one output of the microprocessor, serving to deliver the control signal, is influenced.

49. The electronically commutated motor (M) according to claim 48, wherein the timer (CNT_HL) is, in a specific state, automatically reloaded with a value (t_AR) and restarted.

50. The electronically commutated motor (M) according to claim 48, wherein the microprocessor triggers an interrupt at each change in the signal (HALL) of the rotor position sensor (40, 41); and wherein the timer (CNT_HL) and the interrupts are used to measure a value dependent on rotor speed.

51. The electronically commutated motor (M) according to claim 49, wherein the microprocessor triggers an interrupt at each change in the signal (HALL) of the rotor position sensor (40, 41); and wherein the timer (CNT_HL) and the interrupts are used to measure a value dependent on rotor speed.

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